





INFORMATION SYSTEMS
AND
ORGANIZATIONAL CHANGE

Peter G. W. Keen

May 1980

CISR No. 55
Sloan WP No. 1118-80

(Supersedes Report CISR-46
Sloan WP No. 1087-79)

Center for Information Systems Research

Massachusetts Institute of Technology
Alfred P. Sloan School of Management
50 Memorial Drive
Cambridge, Massachusetts, 02139
617 253-1000

INFORMATION SYSTEMS
AND
ORGANIZATIONAL CHANGE

Peter G. W. Keen

May 1980

CISR No. 55
Sloan WP No. 1118-80

(Supercedes Report CISR-46
Sloan WP No. 1087-79)

TABLE OF CONTENTS

1. Introduction.	1
2. The Causes of Social Inertia.	2
3. Overcoming Social Inertia: A Tactical Approach	8
4. Pluralism: The Need to Mobilize.	11
5. Counterimplementation	14
6. The Tactics of Counterimplementation.	19
7. Countercounterimplementation: The Management Game.	22
8. Conclusion: A Strategic Perspective on Change.	24

FIGURES

1. The Leavitt "Diamond": Components of the Organization. . . .	6
2. Tactical Model for Describing and/or Managing Change. . . .	9
3. Implementation Games.	20
4. Scenario-Writing.	23

1. INTRODUCTION

This paper discusses long-term change in organizations in relation to information systems. The aim is to explain why innovation is so difficult and to point towards effective strategies for managing the process of change. Many commentators have drawn attention to problems of implementation that result in systems being technical successes but organizational failures [Urban (69), Grayson (23), Keen (32), Drake (18)]. Their analyses stresses the complexity of organizational systems and the social inertia that dampens out the intended effects of technical innovations.

The growing body of research on implementation mainly deals with tactical issues: how to create a climate for change and build and institutionalize a specific system.¹ This paper focuses on strategic questions:

- (1) What are the causes of social inertia?
- (2) What are the main organizational constraints on change?
- (3) What are the mechanisms for effecting change?

The dilemma to be resolved is that effective implementation relies on incremental change, small-scale projects and face-to-face facilitation [Ginzberg (22), Vertinsky, et al. (71), Keen and Scott Morton (36)]. A strategy for long-term change and large-scale

¹ See Keen (34) for a critical evaluation of implementation research.

innovation requires a broader strategy; the conceptual and empirical work on implementation, both within MIS and OR/MS and in political science, provides few guidelines and some very pessimistic conclusions. The main argument of this paper is that information systems development is an intensely political as well as technical process and that organizational mechanisms are needed that provide MIS managers with authority and resources for negotiation. The traditional view of MIS as a staff function ignores the pluralism of organizational decision making and the link between information and power. Information systems increasingly alter relationships, patterns of communication and perceived influence, authority and control. A strategy for implementation must therefore recognize and deal with the politics of data and the likelihood -- even legitimacy -- of counter-implementation.

2. THE CAUSES OF SOCIAL INERTIA

"Social inertia" is a complicated way of saying that no matter how hard you try nothing seems to happen. The main causes of inertia in relation to information systems seems to be:

- (1) information is only a small component of organizational decision processes;
- (2) human information-processing is experiential and relies on simplification;
- (3) organizations are complex and change is incremental and evolutionary; large steps are avoided,

even resisted;

- (4) data are not merely an intellectual commodity but a political resource, whose redistribution through new information systems affects the interests of particular groups.

Computer specialists generally take it for granted that information systems play a central role in decision making. Mintzberg's (51) and Stewart's (65) descriptive studies of managers' activities suggest that they often do not [see also Kling (39)]. In general, decision processes are remarkably simple [Miller (50)]; what has worked in the past is most likely to be repeated. Under pressure decision makers discard information, and avoid bringing in expertise and exploring new alternatives [Wilensky (75)] -- they simplify a problem to the point where it becomes manageable. Almost every descriptive study of a complex decision process suggests that formal analysis of quantified information is at best a minor aspect of the situation [Pettigrew (57), Bower (7)]. Negotiations [Strauss (67)] habit, rules of thumb and "muddling through" [Lindblom (46)] have far more force. This may seem an extreme assertion, but there is little if any empirical evidence to challenge it. The point is not that managers are stupid or information systems irrelevant, but that decision making is multifaceted, emotive, conservative and only partially cognitive. Formalized information technologies are not as self-evidently beneficial as technicians presume; many descriptive

models of decision making [Lindblom (46), Cohen and March (12), Hirschman (28)] imply that "better" information will have virtually no impact.

Simon's concept of bounded rationality stresses the simplicity and limitations of individual information processing.² There has for long been a conflict between the normative perspective of OR/MS and MIS, which defines tools based on a rationalistic model of decision making, and the descriptive, largely relativistic position of many behavioral scientists, who argue that that conception is unrealistic.³ Mitroff's study of the Apollo moon scientists is perhaps the most well-supported presentation of this position (54). Regardless of one's viewpoint on how individuals should make decisions, it seems clear that the processes they actually rely on do not remotely approximate the rational ideal, and that this gap between the descriptive and prescriptive is a main cause of inertia:

- (1) there is little evidence to support the concept
of consistent preference functions [Braybrooke and

² Simon (64). See also Cyert and March (13), and, with a different flavor and very different conclusions, Lindblom (47) who argues that:

"The human condition is small brain, big problems. People then need help -- devices, processes and institutions -- to simplify problem-solving." (p. 66)

³ See Keen (33) for an historical summary of the (largely axiomatic) concept of optimality.

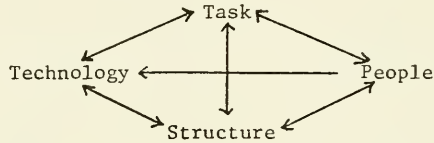
- Lindblom (9), Kahneman and Tversky (31)
Kunruether and Slovic (42)];
- (2) managers and students (the traditional subjects of experiments) have difficulty with simple trade-off choices [Zionts and Wallenius (77)];
 - (3) perceptions are selective [Dearborn and Simon (14)];
 - (4) there are clear biases and personality differences in problem-solving "styles" [Huysmans (30), McKenney and Keen (49), Doktor (16)] that may even lead individuals to reject accurate and useful information [Churchman (11), Doktor and Hamilton (17)];
 - (5) even intelligent and experienced decision makers make many errors of logic and inference [Tversky and Kahnemann (68), Ross (61)]; and
 - (6) managers prefer concrete and verbal data to analysis [Mintzberg (51), Stewart (65)].

All in all, human information-processing tends to be simple, experiential, nonanalytic and, on the whole, fairly effective [Bowman (8), Lindblom (46)]. Formalized information systems are thus often seen as threatening and not useful. They are an intrusion into the world of the users who are rarely involved in their development and see these unfamiliar and nonrelevant techniques as a criticism of themselves.

Leavitt's classification of organizations as a diamond (Figure 1), in which Task, Technology, People and Structure are mutually inter-

FIGURE 1.

THE LEAVITT "DIAMOND": COMPONENTS OF THE ORGANIZATION



related and mutually adjusting, indicates the complex nature of social systems (44). When Technology is changed, the other components often adjust to dampen out the impact of the innovation. Many writers on implementation stress the homeostatic behavior of organizations [Roberts (60), Ginzberg (22), Zand and Sorenson (76)], and the need to "unfreeze the status quo." (This term is taken from the Lewin-Schein framework of social change, discussed below.

Information systems are often intended as coupling devices that coordinate planning and improve management control [Galbraith (21)]. Cohen and March's view of many organizational decision processes as a garbage can (12) and Weick's powerful conception of "loose coupling" (72) imply, however, that signals sent from the top often get diffused, defused and even lost as they move down and across units whose linkages are tenuous. The more complex the organization, the less likely will be the impact of technical change; homeostatic, self-equilibrating forces in loosely coupled systems are a major explanation for the frequency of failure of large-scale planning projects [Hoos (29),

Keen (32), Hall (25)].

The characteristics of individuals and organizations listed above in themselves suggest that dramatic change rarely occurs in complex social systems. Lindblom's well-known concept of muddling through reinforces that view (46). He points to the value of incremental, remedial decision making and rejects the "synoptic ideal." Wildavsky similarly disdains formalized planning and recommends an avowedly political process based on partiality and incremental analysis (74). He contrasts political and economic rationality. The latter looks for optimal solutions through systematic methodologies. Compromise is pathological since by definition it represents a retreat from rationality (one might expect that few people would espouse this position in so pristine a form -- until one listens to a facultyful of microeconomists). Political (or social) rationality looks only for feasible solutions and recognizes that utopian change cannot be assimilated by complex systems composed of individuals with bounded rationality. Only small increments are possible, and compromise, far from being bad, is an essential aspect of the implementation process. The final cause of inertia is less passive

The final cause of inertia is less passive than the others. Data are a central political resource. Many agents and units in organizations get their influence and autonomy from their control over information. They do not readily give that up. Information systems represent a direct threat to them in many instances and they respond accordingly. We now have adequate theories of implementation. We have

less understanding of counterimplementation, the life force of more than a few public sector organizations and a hidden feature of many private ones. This issue is discussed in more detail in section 6.

All these forces towards inertia are constraints on innovation. They are not necessarily binding ones. Implementation is possible but requires patience and a strategy that recognizes that the change process must be explicitly managed. Only small successes will be achieved in most situations. These may, however, be strung together into major long-term innovations. "Creeping socialism" is an instance of limited tactical decisions adding up to strategic redirection; no one step appears radical.

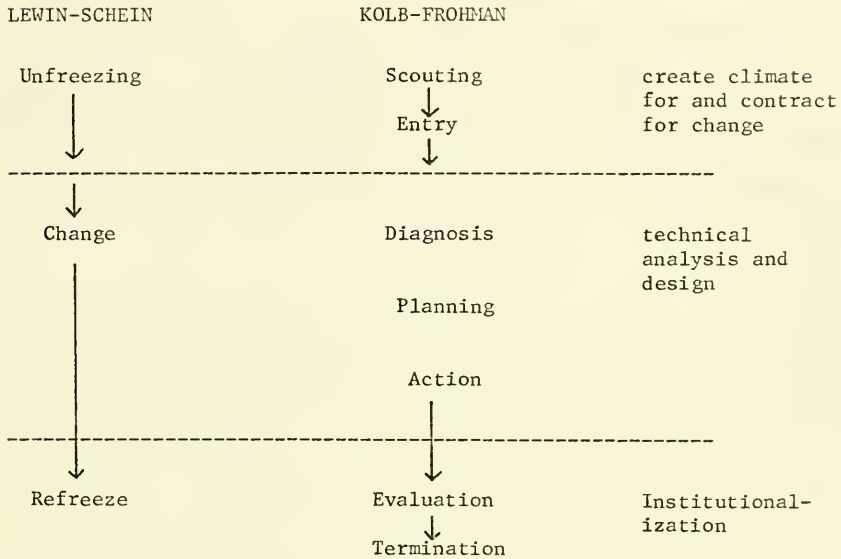
3. OVERCOMING SOCIAL INERTIA: A TACTICAL APPROACH

There are several well-defined tactical models for dealing with inertia. They are tactical in the sense that they largely apply to specific single projects. They recommend simple, phased programs with clear objectives [Pressman and Wildavsky (59)] and facilitation by a change agent or a "fixer" [Bardach (5)], an actor with the organizational resources to negotiate among interested parties and make side payments. The Lewin-Schein framework and an extension of it, Kolb and Frohman's model of the consulting process (41), have been used extensively by researchers on OR/MS and MIS implementation,⁴ both in descriptive studies [Ginzberg (22), Zand and Sorenson (76)] and prescriptive analysis [Lucas and Plimpton (48), Keen (32), Urban (69)]. This conception of the change process (see Figure 2)

⁴ Ginzberg (22) provides a useful summary of this perspective. See also Keen (34).

FIGURE 2.

TACTICAL MODEL FOR DESCRIBING AND/OR MANAGING CHANGE



emphasizes:

- (1) the immense amount of work needed prior to design;
change must be self-motivated and based on a "felt
need" with a contract between user and implementer
built on mutual credibility and commitment;
- (2) the difficulty of institutionalizing a system
and embedding it in its organizational context,
so that it will stay alive when the designer/con-
sultant leaves the scene;

- (3) the problem of operationalizing goals and identifying criteria for success.

This tactical approach is "Up-and-In" rather than "Down-and-Out" [Leavitt and Webb (45)]. DO is based on direction from the top, lengthy design stages and a formal system for planning and project management. UI relies on small groups, with face-to-face involvement and participative management. The design evolves out of the Entry process [Kolb and Frohman (41)].

Leavitt and Webb point out that UI works well for small projects. However, large-scale change requires an engineering approach to design that quickly encounters social inertia. The dilemma is that UI limits itself to feasible, incremental change while DO, the broader strategic process, is rarely successful. The tactical model needs extension; facilitation is not enough and social inertia is dangerously close to social entropy [Bardach (5)].

No formal effective strategic model exists. If it did, one might expect to find it in political science, which frequently reconstructs the processes underlying efforts to deliver major social, technical or political programs [Saplosky (63), Pressman and Wildvasky (59), Hargrove (27), Derthick (15)]. Political science far more deserves the label of the "dismal" science than does economics, which after all believes in the eventual triumph of rationality; most studies in this field deal with failures (Saplosky's analysis of the Polaris project is a rare example of a success). They identify as

forces impeding change not only social inertia but also pluralism and counterimplementation -- overt moves, often made by skilled actors, to prevent a disruption of the status quo. Counterimplementation is most likely when outsiders bring in intrusive new technologies [Munson and Hancock (55), Chesler and Flanders (10)]. Information systems are exactly that in many cases [Argyris (3, 4), Hall (25, 26)].

4. PLURALISM: THE NEED TO MOBILIZE

Political science views organizations mainly as groups of actors, often with conflicting priorities, objectives and values [Allison (1)]. The management literature generally assumes far more commonality of purpose. The Down-and-Out approach relies on this commonality. Up-and-In evades the problem by limiting the scope of the project and hence the number of actors involved; it fails completely if consensus is not impossible. The more the organization is viewed as a set of loosely-coupled units [Weick (72)] where joint action rests on negotiations [Strauss (67)], the more any strategy for implementation must emphasize the need to mobilize coalitions, to provide the necessary support for an innovative proposal. Obviously, that process is based on political rather than economic rationality. The corollary of this argument is that lack of attention to the constraints on change imposed by pluralism in organizations will result in failure.

Many writers who attack the rationalist tradition on which OR/MS and MIS are based stress the legitimacy of pluralism and hence of

incremental decision making. Lindblom sees the use of social interactions instead of analysis and planning as analogous to reliance on a market system to simplify the process of resource allocation (48). Strauss argues that "social order" and decision making in any organization are predominantly based on negotiations:

"...when individuals or groups or organizations work together to 'get things done' then agreement is required about such matters as what, how, when, where, and how much. Continued agreement itself may be something to be worked at...negotiations pertain to the ordering and articulation of an enormous variety of activities."⁵

In many instances, pluralistic perspectives view formal information systems as either ethically dangerous in that they impose a false rationality [Hoos (29)], are naive [Wildavsky (74)] or are simply irrelevant [Lindblom (46)]. They also deny their value as coupling devices that help coordinate planning and communication; pluralists see merit in disorder and redundancy [Klein and Meckling (37)]. Weiner and Wildavsky, commenting on federalism, summarize this argument: what is needed is "planning with a different aim: to foster choice through careful structuring of social interaction."⁶

These viewpoints are obviously not shared by most proponents of analytic methodologies. Since they are mainly based on studies of

⁵ Strauss (67), page ix.

⁶ Weiner and Wildavsky (73), page 17.

public policy issues, one may argue that business organizations are more tightly-coupled and less dominated by pluralism and incrementalism. This may be true in particular instances; there are many companies whose planning systems are effective in establishing and communicating goals, involving managers in the decision process and creating a climate for innovation [Vancil and Lorange (70)]. Even so, most case studies of complex decisions suggest that companies are far more pluralistic than we conveniently assume. Pettigrew's analysis of a decision to purchase a computer, for example, reveals innumerable territorial disputes, maneuvering for position, conflict over goals, and irreconcilable differences in perspective among organizational units (57). Believers in pluralism do not find that surprising. Most computer specialists do.

The point here is not to justify pluralism. It seems clear, however, that it is a main cause of inertia. "Getting things done", whether Down-and-Out or Up-and-In, requires careful building of coalitions, based on complex negotiations. The larger the scope of a project and the more strategic its goals, the more true this will be, because of the "geometric growth of interdependencies...whose implications extend over time" [Pressman and Wildavsky (59)]. Section 8 of this paper suggests some organizational mechanisms that can provide information systems developers with the authority and resources to resolve these complexities or joint action.

5. COUNTERIMPLEMENTATION

Believers in rationalism generally view resistance to change and protection of vested interests as faults to be ignored or suppressed. The tactical approach to implementation sees resistance as a signal from a system in equilibrium that the costs of change are perceived as greater than the likely benefits. The bringers and sellers of change -- academics, computer specialists and consultants -- assume that what they offer is Good. In practice, there are many valid reasons to go beyond passive resistance and actively to try to prevent implementation. Many innovations are dumb ideas. Others threaten the interests of individuals and groups by intruding on their territory, limiting their autonomy, reducing their influence or adding to their workload. While we all may try to act in the "corporate" interest, we often have very different definitions of exactly what that is [Dearborn and Simon point out that even senior executives adopt the perspective of their department (14)].

Obviously there is a fine line between honest resistance to a project one feels is misguided and selfish sabotage of a necessary innovation. The difference is a matter for conscience and self-scrutiny. In both cases, the response is political, whether "clean" or "dirty" politics. It requires skill.

Bardach (5) defines implementation as a game and outlines some of the moves and countermoves by which actors:

- (1) divert resources from a project;
- (2) deflect its goals;

(3) dissipate its energies.

A central lesson to be learned from examples of successful counter-implementation is that there is no need to take the risky step of overtly opposing a project. The simplest approach is to rely on social inertia and use moves based on delay and tokenism. Technical outsiders should be kept outside and their frequent lack of awareness of organizational issues encouraged ("why don't you build the model and we'll deal with the people issues later; there's no need to have these interminable meetings"). If more active counterimplementation is needed, one may exploit the difficulty of getting agreement among actors with different interests by enthusiastically saying "great idea -- but let's do it properly!", adding more people to the game and making the objectives of the venture broader and more ambitious -- and consequently more contentious and hard to make operational.

This author has found examples of most of the tactics Bardach identifies, in an ongoing study of the implementation of information systems and models for educational policy analysis in state government. Before discussing them, it is important to examine what is perhaps the single most important cause of counterimplementation in information systems development -- the politics of data.

The link between control over information and influence has often been noted. "Information is a resource that symbolizes status, enhances authority and shapes relationships" [Wildavsky (74)]. "Information is an element of power" [quoted in Greenberger, et al. (24)].

Computer systems often redistribute information, breaking up monopolies. Building a database then becomes a political move; sometimes it is equivalent to a declaration of war. The system designer needs to ask:

- (1) who owns the data?
- (2) who share it?
- (3) what will be the perceived impact of redistribution on:
 - (a) evaluation;
 - (b) influence and authority;
 - (c) communication?

He or she should then get ready to deal with counterimplementation.

Dornbusch and Scott define evaluation as central to the exercise of authority (18). In general, providing management (or outside agencies) with data that permit closer observation of subordinates' decision making or that help define additional output measures increases control and decreases autonomy. Many public sector agencies protect data on their operations as a means of maintaining their independence. Laudon's study of information systems in local government provides many illustrations of this point (43). For example, police agencies protect their data from mayors and budget agencies; information is control [see also Pettigrew (58)].

Evaluation and monitoring are often "improved" (from the manager's viewpoint) through the collection of routine operational data. An unanticipated side-effect of information systems is an increase in superior's ability to evaluate personnel. For example, telecommunications,

office automation and integrated data bases record and provide simple access to information that may then be used to observe subordinates. The introduction of office automation has, for instance, led some managers to study "productivity" of clerical staff, measured in terms of lines types or error rates. Hospitals similarly use computer-derived data to track nurses' performance; previously, evaluation required interaction, some degree of negotiation and respect for the nurses' "professional" judgement. Some managers are concerned that trends in computer networking and database administration may similarly encourage their superiors to second-guess them or to snoop.⁷

The link between evaluation and authority is recognized by many trade union leaders. Greenberger et al.'s discussion of the joint effort of Rand and the administration of Mayor Lindsay in New York to apply management science to city government provides several examples of their refusal to permit data to be gathered that might later be used to evaluate productivity (24). Teacher unions similarly oppose efforts to introduce accountability programs. In at least one state, the Department of Education joined with them in an elegant counterimplementation move, a variant of one Bardach (5) labels Pile On. Legislation had been tacked onto a school finance bill, requiring teacher accountability measures. The department suggested six

⁷ See Kling and Gerson (40). Bariff and Galbraith (6) provide an excellent summary of power issues in relation to information systems, viewed mainly in terms of the accounting function.

comprehensive programs, all of which involved collecting and processing additional data. It then scheduled about 30 state-wide meetings, open to parents, the press, school officials and teachers and loftily entitled "The Search for Consensus". This generated 44 separate accountability measures. The program is, of course, now dead. This counterimplementation was overt and skilled, but puzzling to analysts who saw the need for "better" data as in the interests of all.

The corollary of the link between evaluation and authority is the relationship between ownership of information and autonomy. In some cases, departments or individuals have influence only because they have a data monopoly. [Cyert and March (13) comment that organizations are partly designed in terms of rules for filtering and channelling data; particular units are given responsibility for collecting and interpreting data and other units may not challenge them.] Finance and Planning, for example, may own data on capital allocations. In state government agencies, budget officials often have a monopoly on the details of particular programs and expenditures which gives them great influence on the decision making process. Staff specialists, who often lack direct authority, rely on careful rationing of technical information in negotiations and on their ability to withhold data [Pettigrew (58)].

Information systems redistribute data and are sometimes intended to break up monopolies. This may be equivalent to redesigning parts of the organization, disrupting patterns of communication and

reallocating authority. Of course, this also means that they may be explicitly used to "perpetuate or modify decision processes and social structures" [Bariff and Galbraith (6)]. They then become a tool for organizational development in the most literal sense of the term. The key point is that designers must recognize that, far from being neutral and divorced from messy "politics", information technology has a major impact on a critical resource and source of power. It is hardly surprising then that teachers view a productivity reporting system as an outrage or that operating divisions oppose the efforts of Finance to coordinate planning through a budget tracking system. Computer specialists tend to be very surprised.

6. THE TACTICS OF COUNTERIMPLEMENTATION

A key step in the tactical approach to implementation is to convert the general impetus for change, which is usually based on broad goals and rallying cries, into operational objectives and a specific contract [Kolb and Frohman (41), Ginzberg (22)]. Any project is very vulnerable to counterimplementation until this is done. Programs that have unclear goals or ambiguous specifications and that rely on continuing high levels of competence and coordination are easy targets for skilled gameplayers. Bardach (5) outlines a variety of games (Figure 3). Easy Money involves supporting a project because it can be used to finance some needed activity within the player's sphere of interest. The Budget game is played by managers as budget maximizers and Territory is similarly used to protect or extend control.

FIGURE 3.
IMPLEMENTATION GAMES (BARDACH)

<u>Diverting Resources</u>	<u>Sample Motivation</u>
Easy Money	"Get a little more than we give back"
Budget	"We never turn down money"
Easy Life	"Make sure we're in charge and don't let outsiders cause trouble; take it slowly"
Pork Barrel	The elected official's version of Easy Money; "grab it while you can"
<u>Deflecting Goals</u>	
Pile On	"Let's do it right! -- "We have to make sure our interests are included in the project"
Up for Grabs	"If they don't know what they want, we'll take over"
Keep the Peace	"We're going to have to work closely with Marketing and make sure we're both happy"
<u>Dissipating Energies</u>	
Tenacity	"No." "One more time."" We're not happy about..."
Territory	"This is <u>our</u> job." "We think we should run the project since..."
Not our Problem	"Marketing really ought to handle this."
Odd Man Out	"We're certainly interested and we'll be happy to provide some inputs, but..."
Reputation	"I want an integrated-on-line-real-time-database-management-distributed-processing-plannings system. My system will..."

Within a Game, there are some predictable moves. Tenacity exploits social inertia and interdependencies: "all it takes is the ability and the will to stymie the completion, or even the progress, of a program until one's own particular terms are satisfied."⁸ Odd Man Out creates an option to withdraw if the project gets into trouble -- and then to say "I told you so". This move is made easiest in projects where only the designer is accountable and no visible commitment required from the gameplayer. Up For Grabs is used to take over a program where the mandate is half-hearted or ambiguous.

All these moves are found in information systems development. There is an additional manoeuver employed wherever computers are found -- the Reputation game. Here, a manager gets credit as a bold innovator by sponsoring a new system -- the closer to the state-of-the-art the better, since this increases his or her visibility and creates excitement. The Reputation gamer will have been transferred to a new position by the time the project collapses and can then ruefully say "when I was in charge of things..." The short tenure of upwardly mobile managers and their need to produce fast results encourages this move, which is however only possible when the goals of the project are not made operational nor specific commitments made to deliver phased outputs.

The analysis of implementation as a game may seem overcynical. However, it seems essential at least to ask at the start of a project:

⁸ Bardach (5), page 148.

- (1) are people likely to play games?
- (2) is the proposal proof against subversion?

These two simple questions provide the base for a defensive strategy.

7. COUNTERCOUNTERIMPLEMENTATION: THE MANAGEMENT GAME

Most of the moves Bardach discusses exploit ambiguity and a lack of control mechanisms. The Reputation gameplayer can get early credit and not be held accountable later. Easy Money is possible only because the goals of the project are too broadly stated. Odd Man Out occurs when technicians have to carry the venture (or choose to do so). Bardach suggests designers use "scenario-writing" (Figure 4) and in essence ask "who can foul it up." The tactical approach to implementation makes the same recommendation, though more optimistically, at the Entry stage the implementer tries to identify and bring into the (facilitative) negotiations any party whose actions or inactions can affect the chances of success. Scenario-writing forewarns the designer and partially protects him or her against:

- (1) monopoly and tokenism;
- (2) massive resistance; and
- (3) delays, deliberate or accidental.

Bardach recommends a variety of responses to counterimplementation, such as creating substitute monopolies (information systems personnel can use their specialized technical resources in this way for bargaining), coopting likely opposition early, providing clear incentives

FIGURE 4.

SCENARIO-WRITING

(adapted from Bardach)

- A. Basic objectives: What exactly are you trying to get done? (not what does the system look like?)
What resources are needed?
Who controls them, directly or indirectly?
How can you minimize the effects of social inertia?
- B. Dilemmas of Administration: What elements are critical?
Are any of them subject to monopoly interests?
Will their owners be uncooperative?
Can you work around them or buy them off?
Will they respond with delays or tokenism?
How will you deal with massive resistance?
- C. Games: What games are likely to
a) direct resources?
b) deflect goals?
c) dissipate energies?
How can you counteract or prevent them, if necessary by redesigning the project?
- D. Delay: How much delay should you expect?
What negotiations are needed?
What resources do you have for negotiations and/or control?
Would it help to use project management, work around possible obstacles and delay, or enlist intermediaries?
- E. Fixing the Game: What senior management and staff aid do you need?
What resources do they have?
What incentives are there for them to play the fixer role?
Can you build a coalition to fix the the game?

("If policy analysts carry bumper stickers, they should read 'Be Simple! Be Direct' or 'PAYMENT ON PERFORMANCE'⁹ [Pressman and Wildavsky (59)]), and creating a bandwagon.

The Management game uses control mechanisms overlaid on others' games. By assigning priorities, developing project management procedures and, above all, by keeping the scope of the project small and simple -- which is often intellectually harder than designing a complicated system -- the implementer can limit the range of moves actors can make. The Management game is difficult to play without a "fixer"¹⁰, a person or group with the prestige, visibility and legitimacy to facilitate, deter, bargain and negotiate effectively. Information systems teams often lack this key support.

8. CONCLUSION: A STRATEGIC PERSPECTIVE ON CHANGE

Countercounterimplementation (CCI) is largely defensive, whereas the facilitative tactical approach is proactive. To an extent, CCI involves containing and doing the opposite of counterimplementers, whose strategy may be summarized as:

- (1) lay low;
- (2) rely on inertia;

⁹ Pressman and Wildavsky (59), page 159.

¹⁰ Bardach (5), pages 273-278. The concept of a fixer vastly extends the platitude in the implementation literature of the need for top management support.

- (3) keep the project complex, hard to coordinate and vaguely defined;
- (4) minimize the implementers' legitimacy and influence;
- (5) exploit their lack of inside knowledge.

The tactical model addresses some of these issues:

- (1) make sure you have a contract for change;
- (2) seek out resistance and treat it as a signal to be responded to;
- (3) rely on face-to-face contracts;
- (4) become an insider and work hard to build personal credibility;
- (5) coopt users early.

A strategic model for change needs to resolve some additional concerns:

- (1) what happens when consensus is impossible?
- (2) how can large-scale projects evade social inertia?
- (3) what authority mechanisms and organizational resources are needed to deal with the politics and data and counterimplementation?
- (4) what is the role of management?

Some points are obvious from the analysis so far. Whether we like it or not, we can only hope for incremental change [except, as Ansoff points out (2) in situations of mild crises, where the

status quo no longer is satisfactory, and organizations rethink their goals and are more willing to think "rationally"]. This reality suggests that systems designers must always aim for simplicity of design and precise objectives. However, if they are to go beyond tactical innovations based on Up-and-In, they need Down-and-Out directional planning; they must establish the direction of change and evolve complex systems out of phased components. This requires several non-technical resources:

- (1) a meaningful steering committee;
- (2) authority.

The analysis in this paper indicates that information development must be spearheaded by a general, not coordinated by aides-de-camp. It must be defined as part of the Information function of the organization, instead of being a staff service labelled data-processing or management science. The issues of negotiations seems central [Kling and Gerson (40)]. To position a system one must clarify objectives, respond to resistance, adjust other components of the Leavitt Diamond (Task, Technology, People, Structure) and block off counterimplementation. The politics of data [and of software engineering; see Keen and Gerson (35)] make it essential that negotiations be handled by a fixer, well-linked into senior managers' decision making. Large scale change is a process of coalition-building; this cannot be done by staff analysts, who are too easily caught in the middle, at the center of conflict with no formal powers.

The strategy for managing social change is based on acceptance of the political nature of information systems development and the need for suitable authority. Many organizations have moved in this direction. Neal and Radnor and their colleagues (56, 62) conclude that OR/MS groups with formal charters (budgets, senior job titles for their managers, and the right to turn down user requests) are more successful than ones that are a corporate service unit. The few Grand Old Men in the information systems field who have risen up to senior positions in large companies have built up organizational mechanisms that provide them with authority and strong links with top level planning in the organization [Strassman (66), Edelman (20)]. There is perhaps an almost Darwinian process of natural selection; where the MIS group adopts a purely technical focus or cannot obtain authority for negotiations, it becomes merely a data processing service, limited to routinized applications and subject to all the forces of inertia and counterimplementation discussed here.¹¹

It is not the aim of this paper to define a specific strategy for implementation. The outline seems clear:

¹¹ See Keen and Gerson (35) and Keen (32), who argues that most MIS groups are locked into the "maintenance" activities of the organization which reinforce the status quo and emphasize efficiency. They have little impact on the "adaption" functions, which involve innovation and strategic planning.

- (1) a senior level fixer must head the Information function; he or she must have full authority and resources to negotiate with or between users and with those affected by information systems;
- (2) there must be some policy planning or steering committee which includes senior line managers; it will delegate to technical staff responsibility for projects that do not have significant organizational impact but will be actively involved with ones that are part of the politics of data (the policy committee also provides a negotiating table);
- (3) the planning process will require substantial time and effort in the pre-design stages, where objectives are made operational and evolution of the larger system is defined by breaking it into clear phases;
- (4) formal contracts will be needed, in which commitments must be clearly made and such games as Up for Grabs, Reputation, Easy Life, and Territory made illegal and ineffectual;
- (5) "Hybrid" skills must be developed in systems staff; they cannot dismiss organizational and political issues as irrelevant or not their responsibility, but must be able to operate in the manager's world

and build credibility across the organization.¹²

- (6) with the umbrella provided by the fixer's authority and the steering committee, the tactical approach remains an excellent guide to managing the implementation process for a given project.

The simple, central argument presented here is that information systems development is political as well as -- sometimes far more so than -- technical in nature. When that is accepted, the organizational mechanisms follow fairly naturally. Unfortunately, "politics" have been equated with evil, corruption and -- worst of all -- blasphemy in the presence of the Rational Ideal, but politics are the process of getting commitment, of building support, of creating momentum for change; they are inevitable and perhaps desirable in a world where choice is difficult and the future full of ambiguity and uncertainty [Wildavsky (74)].

The final comments to be made here concern research. There have been few studies of political aspects of information systems development. The topic is rarely discussed in textbooks and even the literature on tactical implementation deals with it only peripherally. Yet when one tries to reconstruct or observe the progress of any major project, this is an obvious and important feature. It is absurd to ignore it or treat it as somehow an unsuitable subject for

¹² See Keen and Scott Morton (36), chapter 9.

study or for training MIS specialists. There is some fragmented research available: Pettigrew's observation of a computer purchase decision (57), Laudon's Computers and Bureaucratic Reform (43) and the work done by the Urban Information Systems Research Group at the University of California at Irving [Kling (38, 39)]. Greenberger et al. also provide some vivid illustrations of the political nature of computer models in public policy making. Most of this work is based on cases. Politics are hard to study. They involve many hidden agenda (counterimplementers do not boast about their triumphs) and in most instances a skilled observer has to ferret out and interpret what has happened. In political science, the work on implementation is almost entirely narrative and descriptive. A political perspective on information systems is needed in research. It will of necessity be based on comparative field studies that illustrate theoretical concepts.¹³ It will not fit the standard mold for behavioral research. It can immensely add to our understanding both of the implications of information technology and the dynamics of effective implementation. For a long time the word "implementation" was not included in the index to literature on OR/MS and MIS. It is to be hoped that "politics",

¹³ Mintzberg (52) provides a rich discussion of the difficulties of studying phenomena which involve "soft" variables and need an integrating perspective. His own field research (51) is a striking example of how much we can learn from simple, imaginative observation, which often conflicts with complex over-narrow experimentation.

"negotiations" and "authority" be increasingly found in the titles of papers on information systems. That the papers will often be case studies does not mean they are not "legitimate" research. We badly need more understanding of these issues that are of fundamental importance to the effective exploitation of computer technology.

BIBLIOGRAPHY

- (1) Allison, G. T., Essence of Decision, Little Brown, Boston, Massachusetts, 1971.
- (2) Ansoff, H. I., Business Strategy (ed.), Penguin, London, England, 1968.
- (3) Argyris, C., "Resistance to Rational Management Systems", Innovation, No. 10, November 1970, pp. 28-24.
- (4) Argyris, C., "Management Information Systems: The Challenge to Rationality and Emotionality", Management Science, Vol. 17, No. 6, 1971, pp. B275-292.
- (5) Bardach, E., The Implementation Game: What Happens After a Bill Becomes a Law, MIT Press, Cambridge, Massachusetts, 1977.
- (6) Bariff, M. L. and J. R. Galbraith, "Intraorganizational Power Considerations for Designing Information Systems", The Wharton School, University of Pennsylvania, Philadelphia, Pennsylvania, January 1978.
- (7) Bower, J., The Resource Allocation Process, Irwin, New York, 1970.
- (8) Bowman, E. H., "Consistency and Optimality in Managerial Decision Making", Management Science, Vol. 9, No. 2, January 1963. pp. 310-321.
- (9) Braybrooke, D., and C. E. Lindblom, A Strategy of Decision, Free Press, New York, 1963.
- (10) Chesler, M. and M. Flanders, "Resistance to Research and Research Utilization: The Death and Life of a Feedback Attempt", Journal of Applied Behavioral Science, Vol. 3, No. 4, Fall 1967, pp. 465-487.
- (11) Churchman, C. W., "Managerial Acceptance of Scientific Recommendations", California Management Review, Fall 1974, pp. 31-38.
- (12) Cohen, M. R., and J. G. March, Leadership and Ambiguity, McGraw-Hill, New York, 1974.
- (13) Cyert, R. M., and J. G. March, A Behavioral Theory of the Firm, Prentice-Hall, Englewood Cliffs, New Jersey, 1963.
- (14) Dearborn, D. C., and H. A. Simon, "The Identification of Executives", in H. A. Simon, Administrative Behavior, (3rd Edition), Free Press, New York, 1976, pp. 309-314.

- (15) Derthick, M., "New Towns In-Town", The Urban Institute, Washington, D. C., 1972.
- (16) Doktor, R. H., "Development and Mapping of Certain Cognitive Styles of Problem-Solving", Unpublished Ph.D. Dissertation, Stanford University, Stanford, California, 1969.
- (17) Doktor, R. H., and W. F. Hamilton, "Cognitive Style and the Acceptance of Management Science Recommendations", Management Science, 1973, pp. 884-894.
- (18) Dornbusch, S., and W. R. Scott, Evaluation and the Exercise Authority, Jossey-Bass, San Francisco, California, 1975.
- (19) Drake, J. W., The Administration of Transportation Modelling Projects, Heath, Lexington, August, 1972, pp. 14-17.
- (20) Edelman, F., "Four Ways to Oblivion -- A Short Course on Survival", Interfaces, August, 1972, pp. 14-17.
- (21) Galbraith, J. R., Designing Organizations, Addison-Wesley, Reading, Massachusetts, 1977.
- (22) Ginzberg, M. J., "A Process Approach to Management Science Implementation", Unpublished Ph.D. Dissertation, Sloan School of Management, M.I.T., Cambridge, Massachusetts, 1975.
- (23) Grayson, C. J., "Management Science and Business Practice", Harvard Business Review, July-August 1973, pp. 41-48.
- (24) Greenberger, M., M.A. Crenson and B. L. Crissey, Models in the Policy Process, Russell Sage Foundation, New York, 1976.
- (25) Hall, W. K., "Strategic Planning Models: Are Top Managers Really Finding Them Useful?", Journal of Business Policy, Vol. 3, No. 2, 1973, pp. 33-42.
- (26) Hall, W. K., "Rationality, Irrationality and the Policy Formulation Process in Large Organizations", Planning Review, May 1976, pp. 22-26.
- (27) Hargrove, E. C., "The Missing Link: The Story of Implementation Process", The Urban Institute, Washington, D. C., 1975.
- (28) Hirschman, A. O., The Strategy of Economic Development, Yale University Press, New Haven, Connecticut, 1958.
- (29) Hoos, I. R., Systems Analysis in Public Policy, University of California Press, Berkeley, California, 1972.

- (30) Huysman, H. B. M., The Implementation of Operations Research, Wiley, New York, 1970.
- (31) Kahneman, D., and A. Tversky, "Prospect Theory: An Analysis of Decision Under Risk", Econometrica, 1978.
- (32) Keen, P. G. W., "Managing Organizational Change: The Role of MIS", in J. D. White (ed.), Proceedings of the Sixth and Seventh Annual Conferences of the Society for Management Information Systems, University of Michigan, Ann Arbor, Michigan, July 1976, pp. 129-134.
- (33) Keen, P. G. W., "The Evolving Concept of Optimality", in M. K. Starr and M. Zeleny (eds.), Multi-Criteria Decision Making, The Institute of Management Sciences (TIMS), Studies in Management Sciences, Vol. 6, 1977, pp. 31-57.
- (34) Keen, P. G. W., Implementation Research in MIS and OR/MS: Description versus Prescription, Stanford Business School Research Paper No. 390, Stanford, California, 1977.
- (35) Keen, P. G. W., and E. M. Gerson, "The Politics of Software Engineering", Datamation, November 1977, pp. 80-86.
- (36) Keen, P. G. W., and M. S. Scott Morton, Decision Support Systems: An Organizational Perspective, Addison-Wesley, Reading, Massachusetts, 1978.
- (37) Klein, B., and W. Meckling, "Applications of Operations Research to Development Decisions", Operations Research, Vol. 6, No. 3, May-June 1958, pp. 352-363.
- (38) Kling, R., "Computers and Social Power", Computer and Society, Vol. 1, No. 5, 1974, pp. 6-11.
- (39) Kling, R., "Information Systems in Policy Making", Telecommunications Policy, March 1978.
- (40) Kling, R., and E. M. Gerson, "The Social Dynamics of Technical Innovation in the Computing World", Symbolic Interaction, 1977, p. 146.
- (41) Kolb, D. A., and A. L. Frohman, "An Organizational Development Approach to Consulting", Sloan Management Review, Vol. 12, No. 1, Fall 1970, pp. 51-65.
- (42) Kunruether, H., and P. Slovic, "Economics Psychology and Protective Behavior", American Economic Review, Papers and Proceedings, May 1978.

- (43) Laudon, K. C., "Computers and Bureaucratic Reform: The Political Functions of Urban Information Systems", Wiley, New York, 1974.
- (44) Leavitt, H. J., "Applying Organizational Change in Industry: Structural, Technological and Humanistic Approaches", in J. G. March (ed.), Handbook of Organizations, Rand McNally, Chicago, Illinois, 1965.
- (45) Leavitt, H. J., and E. Webb, "Implementing: Two Approaches", Stanford University, Research Paper 440, California, May 1978.
- (46) Lindblom, C. E., "The Science of Muddling Through", Public Administration Review, Vol. 19, No. 2, Spring 1959, pp. 79-88.
- (47) Lindblom, C. E., Politics and Markets, Basic Books, New York, 1977.
- (48) Lucas, H. C., and R. B. Plimpton, "Technological Consulting in a Grass Roots Action-Oriented Organization", Sloan Management Review, Vol. 14, No. 1, Fall 1972, pp. 17-36.
- (49) McKenney, J. L., and P. G. W. Keen, "How Managers' Minds Work", Harvard Business Review, Vol. 52, No. 3, May-June 1974, pp. 79-90.
- (50) Miller, R. B., "Psychology for a Man-Machine Problem-Solving Process", IBM Data Systems Division Laboratory, Report TR00-1246, February 1965.
- (51) Mintzberg, H., The Nature of Managerial Work, Harper and Row, New York, 1973.
- (52) Mintzberg, H., "Policy as a Field of Management Theory", (Unnumbered paper), Academy of Management Review, January 1977.
- (53) Mintzberg, H., "Beyond Implementation: An Analysis of the Resistance to Policy Analysis", Rapport de recherche 78-06, Ecole des Hautes etudes, Commerciales, L'Universite de Montreal, Montreal, Canada, March 1978.
- (54) Mitroff, I. I., "The Subjective Side of Science: A Philosophic Enquiry into the Psychology of the Apollo Moon Scientists", Elsevier, New York, 1974.
- (55) Munson, F. C., and W. M. Hancock, "Problems of Implementing Change in Two Hospital Settings", AIIE Transactions, Vol. 4, No. 4, December 1977, pp. 258-266.
- (56) Neal, R. D., and M. Radnor, "The Relation Between Formal Procedures for Pursuing OR/MS Activities and OR/MS Group Success", Operations Research, 1973, pp. 451-474.

- (57) Pettigrew, A. M., The Politics of Organizational Decision Making, Tavistock, London, England, 1973.
- (58) Pettigrew, A. M., "Implementation Control as a Power Resource", Sociology, Vol. 6, No. 2, May 1972, pp. 187-204.
- (59) Pressman, J. L., and A. Wildavsky, Implementations, University of California Press, Berkeley, California, 1973.
- (60) Roberts, E. B., "On Implementing Systems Studies: Strategies for Achieving Organizational Change in Response to Model-Based Analysis", paper presented at the American-Soviet Conference Series on Methodological Aspects of Social Systems Simulation, Sukhumki, USSR, October 17-23, 1973.
- (61) Ross, L., "The Intuitive Psychologist and His Shortcomings", in L. Berkowitz (ed.), Advances in Experimental Social Psychology, Academic Press, New York, pp. 173-220, 1964.
- (62) Rubenstein, A. H., et al., "Some Organizational Factors Relative to the Effectiveness of Management Science Groups in Industry", Management Science, Vol. 13, No. 8, 1967, pp. B508-518.
- (63) Saplosky, H. M., The Polaris System Development, Harvard University Press, Cambridge, Massachusetts, 1972.
- (64) Simon, H. A., "A Behavioral Model of Rational Choice", in H. A. Simon, Models of Man, Wiley, New York, 1957, pp. 241-260.
- (65) Stewart, R., Mangers and Their Jobs, McMillan, London, England, 1967.
- (66) Straussman, P., "Managing the Costs of Information", Harvard Business Review, September-October 1977, pp. 133-142.
- (67) Strauss, A., Negotiations: Varieties, Contexts, Processes, and Social Cries, Jossey-Bass, San Francisco, California, 1978.
- (68) Tversky, D., and A. Kahneman, "Judgement Under Uncertainty: Heuristics and Biases", Science, 1974, pp. 1124-1131.
- (69) Urban, G. L., "Building Models for Decision Makers", Interfaces, Vol. 4, No. 3, May 1974, pp. 1-11.
- (70) Vancil, R., and P. Lorange, Strategic Planning Systems, Prentice-Hall, Englewood Cliffs, New Jersey, 1977.
- (71) Vertinsky, I. R., T. Barth, and V. F. Mitchell, "A Study of OR/MS Implementation as a Social Change Process", in R. L. Schultz and D. P. Slevin, Implementing Operations Research/Management Science, American Elsevier, New York, 1975, pp. 253-272.

- (72) Weick, K., The Social Psychology of Organizing, Addison-Wesley, Reading, Massachusetts, 1969.
- (73) Weiner, S., and A. Wildavsky, "The Prophylactic Presidency", Public Interest, No. 52, Summer 1978, pp. 3-19.
- (74) Wildavsky, A., The Politics of the Budgetary Process (2nd Ed.), Little, Brown, Boston, Massachusetts, 1974.
- (75) Wilensky, H. L., Organizational Intelligence: Knowledge and Policy in Government and Industry, Basic Books, New York, 1967.
- (76) Zand, D. E., and R. E. Sorenson, "Theory of Change and the Effective Use of Management Science", Administrative Science Quarterly, Vol. 20, No. 4, December 1975, pp. 532-545.
- (77) Zionts, S. and J. Wallenius, "An Interactive Programming Method for Solving the Multiple Criteria Problem", Management Science, Vol. 22, No. 6, February 1976, pp. 652-663.

7382 001

